

ABSTRACT

An optical data storage device for multi-level recording having: a substrate, and a phase change memory medium supported by the substrate. The phase change memory medium preferably has an alloy with a eutectic crystallization base component and at least one element for enhanced sigma-to-dynamic range. The multi-level data storage device is preferably an optical disk with a single layer of memory material for providing multi-level recording with a sigma-to-dynamic range of less than 2%.

The phase change recording alloy is preferably an In:Sb:Te material. Preferably, Sb:Te is present at a ratio at, or near, the eutectic point when combined with 30% or less In. A preferred phase change memory material includes an alloy defined by the formula: $\text{In}_x (\text{Sb}_n \text{Te}_{100-n})_{100-x}$ where x is 3-30, and n is 63-82.